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CLAIMS

1. A device for dispensing individual doses of powder from respective pockets of a carrier, the device including:
  - 5 a support for a carrier having a plurality of pockets containing respective doses of powder; and
  - a mouthpiece through which to inhale an airstream carrying a dose of powder; the device further including:
    - 10 walls for defining individual respective first flow paths downstream of each respective pocket of a supported carrier wherein each individual respective first flow path is defined entirely by respective walls unique to that individual respective first flow path, is for connecting the corresponding respective pocket to the mouthpiece and is for deaggregating powder in the airstream.
- 15 2. A device for dispensing individual doses of powder from respective pockets of a carrier, the device including:
  - a support for a carrier having a plurality of pockets containing respective doses of powder; and
  - a mouthpiece through which to inhale an airstream carrying a dose of powder;
  - 20 the device further including:
    - walls for defining individual respective first flow paths downstream of each pocket of a supported carrier for connecting the pockets to the mouthpiece and deaggregating powder in the airstream; and
    - an arrangement for moving individually each pocket from a respective storage
    - 25 position to a respective discharge position, wherein each pocket, in the respective discharge position, forms an integral part of the individual respective first flow path.
3. A device according to claim 2 for use with a carrier having pockets provided with a lidding sheet, the device allowing the lidding sheet to be ruptured as a
- 30 consequence of moving a pocket from a respective storage position to a respective discharge position.

4. A device according to claim 1, 2 or 3 further including:  
walls defining a second flow path connecting with the mouthpiece and  
bypassing the pockets.
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5. A device according to claim 4 wherein:  
with the device configured to dispense a dose of powder from one of the  
pockets of the supported carrier, the respective first flow path connects with the  
second flow path downstream of the bypass and at an angle such that substantially no  
10 powder impacts with the walls defining the second flow path.
6. A device according to claim 5 wherein:  
where the respective first flow path connects with the second flow path, the  
angle between the flow paths is less than 45 degrees and preferably less than 30  
15 degrees.
7. A device according to claim 4, 5 or 6 wherein:  
the support for a carrier and the walls defining the first flow paths are  
moveable with a supported carrier so as selectively to connect respective first flow  
20 paths with the second flow path and hence selectively dispense doses of powder from  
respective pockets of the supported carrier.
8. A device according to any one of claims 4 to 7 wherein:  
the walls defining the first flow paths include, upstream of the pockets,  
25 respective portions of relatively reduced cross-sectional area orientated so as to be  
directed towards respective pockets and direct a relatively high velocity airstream  
into the respective pockets.
9. A device for dispensing a dose of powder from a pocket of a carrier, the  
30 device including:  
a support for a carrier having a pocket containing a dose of powder; and

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a mouthpiece through which to inhale an airstream carrying a dose of powder; the device further including:

walls defining first and second flow paths communicating with the mouthpiece, the first flow path communicating with the pocket of the supported

5 carrier and the second flow path bypassing the pocket; wherein

the walls defining the first flow path include, upstream of the pocket, a portion of relatively reduced cross-sectional area orientated so as to be directed towards the pocket and direct a relatively high velocity airstream into the pocket.

10 10. A device according to claim 8 or 9 wherein:

the portion(s) have a cross-sectional area between 50% and 66% of the cross-sectional area of the smallest part of the second flow path.

11. A device according to claim 8, 9 or 10 wherein:

15 the portion(s) have a cross-sectional area of between 2.0mm<sup>2</sup> and 10.0mm<sup>2</sup>.

12. A device for dispensing individual doses of powder from respective pockets of a pair of carriers, the device including:

a support for two disc shaped carriers, each disc shaped carrier having at least  
20 one substantially planar first side surface having an annular array of cavities in which respective pockets are formed and a respective first lidding sheet sealed to the first side surface for enclosing the cavities, wherein the supports are for rotatably supporting the carriers about a substantially common axis;

a mouthpiece through which to inhale an airstream carrying powder from the  
25 carriers;

a dispensing mechanism for releasing into the airstream the powder of a respective pocket of a supported carrier; and

an indexing mechanism for rotating the carriers relative to the dispensing mechanism so as to enable powder to be released from different pockets.

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13. A device according to claim 12 wherein:  
between consecutive dispensing of powder from one of said carriers, the indexing mechanism is operable to rotate both of said carriers relative to the dispensing mechanism.
- 5 14. A device according to claim 13 wherein:  
between consecutive dispensing of powder from the other of said carriers, the indexing mechanism is operable to rotate both of said carriers relative to the dispensing mechanism.
- 10 15. A device according to claim 12, 13 or 14 wherein:  
the dispensing mechanism is operable to release powder from a pocket of each carrier for a single inhalation of both respective powders simultaneously.
- 15 16. A device according to claim 15 wherein:  
the dispensing mechanism is operable to release powder from a pocket of each carrier simultaneously.
17. A device according to claim 12, 13 or 14 wherein:  
20 the dispensing mechanism is operable to release powder from a pocket of one of the carriers for inhalation then to release powder from the other of the carriers for inhalation.
18. A device according to claim 15, 16 or 17 wherein:  
25 the dispensing mechanism is operable to release powder from a pocket of one carrier and from a pocket of the other carrier consecutively.
19. A device according to any one of claims 12 to 18 including two of said disc shaped carriers respectively containing powder of different medicament.

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20. A device according to claim 12 wherein:  
between consecutive dispensing of powder, the indexing mechanism is operable to rotate one of said carriers in turn between consecutive dispensing positions before rotating the other of said carriers.
- 5 21. A device according to claim 12 or 20 wherein:  
the dispensing mechanism and the indexing mechanism are together operable to dispense the powder from all of the pockets from one of said carriers before dispensing powder from pockets of the other of said carriers.
- 10 22. A device for dispensing individual doses of powder from respective pockets of a carrier, the device including:  
a first support for a first carrier having first and second side surfaces opposite each other, an array of cavities in which respective pockets are formed and a first  
15 lidding sheet sealed to the first side surface;  
a first prodger member moveable towards and away from the second side surface of a supported first carrier between a retracted and an extended position;  
a cam member adjacent to and moveable generally parallel with the second side surface of a supported carrier between a rest position and a primed position;  
20 wherein  
the cam member has a first cam surface for engaging with the first prodger member such that movement of the cam member from the rest position to the primed position moves the prodger member from the retracted position to the extended position so as to press on the second side surface of a supported first carrier and  
25 outwardly rupture the first lidding sheet of the supported first carrier.
23. A device according to claim 22 further including:  
a second support for a second carrier having first and second side surfaces opposite each other, an array of cavities in which respective pockets are formed and a  
30 first lidding sheet sealed to the first side surface, the first and second carriers being supported with respective second side surfaces facing each other;

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a second prodger member moveable towards and away from the second side surface of a supported second carrier between a retracted and an extended position; wherein

the cam member has a second cam surface for engaging with the second  
5 prodger member such that movement of the cam member from the rest position to the primed position moves the second prodger member from the retracted position to the extended position so as to press upon the second side surface of a supported second carrier and outwardly rupture the first lidding sheet of the supported second carrier.

10 24. A device according to claim 23 further including:

an indexing mechanism for moving the first and second supports relative to the first and second prodger members so as to selectively align pockets of the carriers with respective prodger members.

15 25. A device according to claim 24 wherein:

the indexing mechanism is arranged such that, with one of the first and second prodger members aligned with a respective pocket, the other of the first and second prodger members is aligned between respective pockets whereby movement of the cam member from the rest position to the primed position causes only the one  
20 of the first and second prodger members to outwardly rupture the first lidding sheet of the corresponding one of the first and second carriers.

26. A device according to claim 25 wherein:

cam member is moveable in a direction towards and away from the second  
25 side surfaces of supported first and second carriers such that, when the other of the first and second prodger members is aligned between respective pockets, movement of the cam member from the rest position to the primed position and the resulting engagement of the other of the first and second prodger members with the corresponding cam surfaces, causes the other of the first and second prodger  
30 members to abut the corresponding second side surface and the cam member to be moved towards the corresponding one of the first and second carriers.

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27. A device according to claim 24, 25 or 26 wherein:  
the cam member is provided on a priming member moveable as part of the indexing mechanism.
- 5 28. A device according to any one of claims 24 to 27 wherein:  
the indexing mechanism is arranged such that, after the first and second carriers have been indexed past all of their respective pockets, the first and second prodger members are both aligned between pockets of respective carriers and, hence, provide resistance to movement of the cam member.
- 10 29. A device according to any one of claims 23 to 28 wherein:  
the cam member includes an elongate flexible member having the first and second cam surfaces on opposite sides.
- 15 30. A device according to any one of claims 22 to 29 wherein:  
the first cam surface and/or the second cam surface include at least one groove into which any stray powder from previously dispensed pockets may move.
- 20 31. A device according to any one of claims 22 to 30 for use with carriers having said cavities formed from respective through holes between the first and second side surfaces, having second lidding sheets sealed to the second side surfaces and having a respective cup-shaped insert in each cavity orientated with an open portion facing the respective first lidding sheet, wherein:  
the first prodger member and/or second prodger member is arranged to  
25 penetrate an aligned through-hole through a second lidding sheet so as to push the corresponding insert outwardly through the first lidding sheet.
- 30 32. A device according to any one of claims 22 to 31 wherein:  
at least one of the cam surfaces is resiliently deformable, the cam member being dimensioned so as to move the prodger members beyond the extended position such that, once a prodger member reaches its respective extended position, further

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movement of the cam member causes the at least one of the cam surfaces to resiliently deform.

33. A device for dispensing individual doses of powder from respective pockets  
5 of a carrier, the device including:  
a chassis;  
a first support mounted on the chassis for rotation about a central axis and for supporting a first carrier having cavities with respective pockets formed therein and arranged in a circular array centred on the central axis, the first support including an  
10 array of gear teeth centred on the central axis;  
a priming member mounted on the chassis for rotation about the central axis;  
and  
an intermittent-motion mounted on the chassis for interaction with the  
priming member and gear teeth of the first support such that rotation of the priming  
15 member from a first position to a second position causes rotation of the first support by a predetermined angle and rotation of the priming member back from the second position to the first position causes no rotation of the first support.

34. A device according to claim 33, wherein the intermittent-motion mechanism  
20 is a Geneva wheel rotatably mounted on the chassis on an axis offset from the central axis.

35. A device according to claim 34 further including:  
a second support mounted on the chassis for rotation about the central axis  
25 and for supporting a second carrier having cavities with respective pockets formed therein and arranged in a circular array centred on the central axis, the second support including an array of gear teeth centred on the central axis; wherein  
the Geneva wheel may interact with the gear teeth of the second support such  
that rotation of the priming member from the first position to the second position  
30 causes rotation of the second support by a predetermined angle and rotation of the



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priming member back from the second position to the first position causes no rotation of the second support.

36. A device according to claim 35 wherein:

the respective arrays of gear teeth of the first and second supports are incomplete circular arrays leaving respective spaces such that, with a space positioned adjacent the Geneva wheel, rotation of the priming member will not rotate the respective supports.

37. A device according to claim 36 further including:

a changeover component located between the first and second supports, the first support having a first feature engaging with the changeover component and the second support having a second feature for engaging with the changeover component; wherein

with the space of the second support adjacent the Geneva wheel, consecutive rotations of the priming member cause only the first support to rotate until the first feature engages the changeover component and then to move the changeover component so as to engage with the second feature and rotate the second support to a position with the space of the second support not adjacent the Geneva wheel, the space of the first support then being adjacent the Geneva wheel and consecutive rotations of the priming member causing only the second support to rotate.

38. A device according to claim 37 wherein:

the changeover component is arranged such that, when the priming member rotates the second support back around to the position with the space of the second support adjacent the Geneva wheel, the second feature does not engage with the changeover component and consecutive rotations of the priming member cause no rotation of either support.

39. A device for dispensing individual doses of powder from respective pockets of a carrier, the device including:

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first and second supports rotatable about a central axis and for supporting respective first and second carriers having cavities with respective pockets formed therein and arranged in respective first and second circular arrays centred on the central axis;

5        a changeover component located between the first and second supports, the first support having a first feature for engaging with the changeover component and the second support having a second feature for engaging with the changeover component; and

10        an indexing mechanism arranged to rotate each of the first and second supports; wherein

the indexing mechanism is arranged to rotate the first support until the first feature engages the changeover component such that the first support then moves the changeover component, the changeover component being arranged to then engage the second feature so as to rotate the second support to a position from which the  
15        indexing mechanism is arranged to rotate the second support.

40.     A device according to claim 39 wherein:

the changeover component rotates the second support from a position at which the indexing mechanism does not rotate the second support and, when the first  
20        support moves the changeover component, the first support moves to a position in which the indexing mechanism does not rotate the first support.

41.     A device according to claim 40 wherein:

when the second support is rotated back around to the position at which the  
25        indexing mechanism does not rotate the second support, consecutive operations of the indexing mechanism cause no rotation of either component.

42.     A device according to any one of claims 37 to 41 wherein:

the changeover component is supported freely between and by the first and  
30        second supports.

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43. A device according to any one of claims 12 to 32 and 39 to 42 wherein:  
each support includes a peripheral array of gear teeth; and  
the indexing mechanism is engageable with the gear teeth so as selectively to  
move the supports and carriers.
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44. A device according to claim 43 wherein the indexing mechanism includes:  
an priming member mounted for rotation about a central axis; and  
an intermittent-motion mechanism, preferably a Geneva wheel rotatably  
mounted on an axis offset from the central axis, for interaction with the priming  
10 member and gear teeth of the supports such that rotation of the priming member from  
a first position to a second position causes rotation of at least one of the supports by a  
predetermined angle and rotation of the priming member back from the second  
position causes no rotation of the at least one of the supports.
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45. A device according to any one of claims 22 to 44 further including a dose  
counter having:  
a first counter ring having an indication of unit counts on a first display  
surface, the first counter ring being rotatable about a counter axis;  
a second counter ring having an indication of tens counts on a second display  
20 surface, the second counter ring being rotatable about the counter axis; and  
an intermittent-motion mechanism, preferably a Geneva mechanism, for  
driving the second counter ring from the first counter ring and rotating the second  
counter ring between consecutive tens counts when the first counter ring rotates  
between two predetermined consecutive unit counts.
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46. A device according to claim 45 wherein the first counter ring is driven with  
rotation of the first support.
47. A device according to claim 45 or 46 wherein the counter axis is coaxial with  
30 the first support.

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48. A device for dispensing individual doses of powder from respective pockets of a carrier, the device including:
- an indexing mechanism for indexing the carrier between respective pockets;
  - a first counter ring having an indication of unit counts on a first display surface, the first counter ring being rotatable about a counter axis;
  - a second counter ring having an indication of tens counts on a second display surface, the second counter ring being rotatable about the counter axis; and
  - an intermittent-motion mechanism for driving the second counter ring from the first counter ring and rotating the second counter ring between consecutive tens counts when the first counter ring rotates between two predetermined consecutive unit counts, the first counter ring being driven with the indexing mechanism.
49. A device according to claim 48 wherein the intermittent-motion mechanism is a Geneva mechanism.
50. A device according to claim 49 wherein:
- the second counter ring is positioned within the first counter ring, the first counter ring includes a pin for engaging a Geneva wheel rotatable about an axis offset from the counter axis and the second counter ring includes features engageable by the Geneva wheel.
51. A device according to any one of claims 45 to 50 wherein:
- the first and second counter rings are positioned one within the other, with the first and second display surfaces adjacent each other.
52. A device for dispensing individual doses of powder from respective pockets of a carrier, the device including:
- an indexing mechanism for indexing the carrier between respective pockets;
  - a first counter ring having an indication of unit counts on a first display surface, the first counter ring being rotatable about a counter axis;

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a second counter ring having an indication of tens counts on a second display surface, the second counter ring being rotatable about the counter axis; and

a mechanism for rotating the second counter ring between consecutive tens counts when the first counter ring rotates between two predetermined consecutive  
5 unit counts, the first counter ring being driven with the indexing mechanism; wherein

the first and second counter rings are positioned one with the other, with the first and second display surfaces adjacent each other.

53. A device according to any preceding claim housing at least one carrier.